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ABSTRACT

Variables that predict success on the Examination for Certification of Educators in Texas (ExCET) were studied, extending a pilot study that focused on one component of the ExCET, Secondary Professional Development (G. Poelzer, L. Zeng, and M. Simonsson, 2000). A representative sample of 87 preservice secondary education teachers was drawn from the academic records of a college of education at which 87% of students were Hispanic American. Data included both practice ExCET and ExCET scores as well as other records related to academic achievement and student characteristics. A regression equation was determined and the residuals were examined. Findings closely approximated those of the pilot study, which involved 71 preservice teachers. The same predictor variables were identified and similar squared multiple correlation coefficients emerged. Results show that success on the ExCET examination professional development test for secondary preservice teachers can be predicted reasonably well with a linear regression equation that includes the variables of reading scores on the Texas Academic Skills program, practice ExCET scores, and ACT Assessment scores, at least for Hispanic students at universities in South Texas. Appendixes describe the test framework, contain some ExCET sample items, and present four study data tables and three figures. (SLD)

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Teacher Certification Tests: Variables that Determine Success for Secondary Pre-Service Teachers

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TEACHER CERTIFICATION TESTS: VARIABLES THAT DETERMINE SUCCESS FOR SECONDARY PRE-SERVICE TEACHERS

Introduction

The concepts of education reform and teacher certification tests have been around since the beginning of the eighties; by the beginning of nineties some states had implemented or were in the process of implementing changes in their teacher education programs including establishing some measure of competency for prospective graduating teachers (Cornett, 1987). Texas replaced the Bachelor of Education Degree with a Bachelor of Interdisciplinary Studies Degree, a degree that requires an academic major along with 18 semester hours of education courses (including student teaching) and, for certification, a passing grade on each of a series of comprehensive examinations testing both subject and professional knowledge.

These certification tests, known as the ExCET (Examination for Certification of Educators in Texas) examinations, test for mastery in the competencies spelled out in the ExCET Preparation Manual (Appendix A). The competencies, in turn, are grouped under broader domains. For example, the framework for professional development, encompasses three domains: understanding learners, enhancing student achievement, and understanding the teaching environment; and fifteen competencies with five, six, and four competencies included in the three domains, respectively. The ExCET format, itself, consists of vignettes followed by

"best answer" multiple-choice items (Appendix B). Test takers who attain a score of 70% meet the criterion for passing, those who do not, repeat the test at a later date. Because education institutions are under pressure to increase the passing rate of first time test takers, it behooves them to identify variables which predict success on the ExCET, including education courses, and ExCET practice sessions, should they exist. Identifying variables is particularly important for education institutions housing large numbers of minority students as the failure rate for these students is sometimes double that of others (Cornett, 1987).

Conducted at a university in South Texas where the student population is approximately 87% Hispanic, this research substantively extended a pilot study that focused on one component of the ExCET: Secondary Professional Development.

Purpose and Perspectives of the Study

The topic of teacher certification tests has attracted considerable attention from educational researchers, teachers, school administrators, and policy makers (Jaeger, 1988; Cornett, 1987; Chambers, Munday, Sienty, and Justice, 1999; White, Burke and Hodges, 1994). Research to identify variables predicting success on teacher certification tests suggests that critical thinking plays a key role in the students' success on teacher certification tests (Chambers et al., 1999). Also, the combined effect of reading ability, grade point average, age, gender and Texas Academic Skills Program (TASP) math, reading; and writing scores can be used as predictors (Chambers et al., 1999). In addition, White et al. (1994) found that both SAT and grade point average predict success on the professional development test of the ExCET. And Poelzer, Zeng, and Simonsson (2000) identified additional variables that predict success for Hispanic students: practice ExCET test scores, TASP reading scores, and ACT scores. Identification of such variables could influence administrator formulation of policies regarding

accountability issues, faculty instructional strategies and content selection in the courses, and student performance on teacher certification tests. This research extends Poelzer et al.'s study by increasing the sample size, determining a regression equation, and evaluating the practicality of using the equation to predict ExCET scores. Knowledge and information on how to select or prepare students effectively for teacher certification is central to educators in both higher education and school districts. The quality of the teacher education program is of utmost importance.

Method

Data Sources

Pre-service teachers, at the university in this study, must complete their academic requirements, attend several study sessions for the ExCET, and pass a practice ExCET test with a minimum score of 70 percent to be eligible to take the ExCET exam. In this study, a representative sample of 87 (36 males, 51 females) secondary education pre-service teachers were drawn from the College of Education's academic records: ExCET data from the 1998-1999 academic year. These data included both practice ExCET and ExCET scores. Records such as TASP (reading, math and writing) scores, ACT scores, overall GPA, and GPA in 18 credit hours of professional development education courses were collected from the university's academic records office. For a description of the variables used in the study see Table 1 (Appendix C).

Measures of Variables

Guided by previous studies on predictors of success on the dependent variable, the professional development ExCET test, and by the need to extend such studies, the following independent variables were considered in the analyses: ACT scores; TASP reading, math and writing scores; overall GPA; GPA for 18 credit hours of professional development education

courses; and practice ExCET test scores. In addition, it was decided to test the practicality of using the resulting regression equation to predict scores on the dependent variable.

Analytical Approach

The Macintosh SPSS 6.0 stepwise multiple linear regression program was used to conduct the statistical analyses. The study will use significance level P=.05 as the criterion level for determining statistical significance, the Pearson Product Moment Correlation, a partial correlation controlling for ACT, and a stepwise linear regression model to assess the predictive value of the variables. A Pearson Product Moment Correlation was performed to measure bivariate relationships among the predictor variables and between each of the predictor variables and the dependent variable. Descriptive statististics were employed to examine the residuals (difference scores between the predicted and actual ExCET scores).

Results

The Pearson Product Moment Correlation shows significant correlations ($p<.05$) between the professional development score on the ExCET and GPA for education courses (r=.30), TASP scores in reading (r=.61), TASP scores in writing (r=.41), ACT scores (r=.55), and ExCET practice test scores (r=.50) (Appendix C, Table 2). A partial correlation, controlling for ACT scores, was then performed resulting in three contributing variables correlating with the ExCET: TASP reading (r=.43), TASP writing (r=.29), and practice ExCET (r=.37) (Appendix C, Table 3). Since the TASP reading and TASP writing scores still correlated significantly (r=.46) with each other, stepwise linear regression is an appropriate method of analysis to determine which of these variables contributes more as a predictor variable. Also, because GPA for education courses did not correlate significantly with ExCET, it was eliminated as a predictor variable. The stepwise multiple linear regression program was then applied to the four remaining

predictors: TASP reading, TASP writing, ExCET practice test, and ACT. It yielded three variables, TASP reading, practice ExCET test, and ACT ($F= 25.53$, df 3/83, $p<.0001$) explaining 47.99 percent of the variance ($R^2 = .4799$). The first variable entered in the regression equation, TASP reading scores ($R=.61$), accounts for 37.41 percent of the variance; adding the ExCET practice test scores increases the predictive value to ($R=.66$) and accounts for an additional 6.75 percent of the variance; and adding ACT scores increases the predictive value, slightly, to ($R =.69$) and accounts for 3.83 percent of the variance (Appendix C, Table 4).

The following regression equation evolved: Predicted ExCET score = (0.18) (TASP Reading score) + (1.00) (Practice ExCET score) + (0.62) (ACT score) -25.63. The Kolmogorov-Smirnov test of normality, the stem and leaf plot, the box-and-whisker plot, and the histogram all show that the difference scores are normally distributed (Appendix D).

Discussion and Educational Importance of the Study

This study extended the research of Poelzer, Zeng and Simonsson, (2000) by increasing the sample size from 71 to 87, by determining a regression equation, and by examining the residuals. Its findings closely approximate those of that previous study: same predictor variables were identified, similar squared multiple correlation coefficients emerged, $R^2 = .4799$ compared with $R^2= .4868$ in the previous study. These observations are evidence that the predictor variables are stable and reliable. As expected, the residuals distributed themselves normally around a mean of 0.9 with the preponderance of scores close to the mean. This finding supports using a regression equation as a practical method of predicting success on the ExCET. That the GPA for education courses did not correlate significantly with ExCET after controlling for ACT scores is puzzling and worthy of further consideration.

In sum, this study shows that success on the ExCET exam for secondary pre-service teachers on the professional development area can be predicted reasonably well with a linear regression equation that includes the variables TASP reading scores, practice ExCET test scores, and ACT scores; at least for Hispanic students attending universities in South Texas. It suggests that raising the criteria for selection in each of the three variables would result in higher proportions of students passing the ExCET on the first attempt. It has further implications for educators: it draws attention to the importance of developing reading skills at the district level and of introducing and developing practice ExCET sessions at the higher education level.

The restricted area of study and the type of population studied limit the generalization of the findings.

Further research involves extending this study to include (a) other pre-service areas such as elementary, early childhood, and special education, and (b) other populations in the State of Texas. Ultimately, one needs to determine the predictive value of the ExCET for success of teachers in the field.

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Appendix A

Test Framework

Domain I- Understanding Learners
(5 competencies = approximately 33% of test)
Domain II- Enhancing Student Achievement
(6 competencies = approximately 40% of test)
Domain III- Understanding the Teaching Environment
(4 competencies = approximately 27% of test)

Organization of the Test Frameworks

The content covered by a test is organized into three or more domains. Within each domain the content is defined by a set of competencies. Each competency is composed of two major parts:

1. the *competency statement*, which broadly defines the content that an entry-level educator needs to know, and
2. the *descriptive statement*, which describes in greater detail the types of knowledge and skills covered by the competency.

An example of a competency and its accompanying descriptive statement is provided below.

Sample Competency and Descriptive Statement

Professional development (Fields 02 and 03)
Domain: Understanding Learners

Competency: "The teacher appreciates human diversity, recognizing how diversity in the classroom and the community may affect learning and creating a classroom environment in which both the diversity of groups and the uniqueness of individuals are recognized and celebrated."

Descriptive Statement: "The teacher is aware that each student brings to the classroom a constellation of personal and social characteristics related to a variety of factors such as ethnicity, gender, language background, exceptionality, etc. The teacher recognizes the instructional implications of student diversity and knows how to turn the diversity within and beyond the classroom to advantage by creating an environment that nurtures a sense of community, respects differences, fosters learning, and enhances students' understanding of the society in which they live."

"The competencies are broad, conceptual statements, written in a language that reflects the skills, knowledge, and understanding that an entry-level teacher needs in order to teach effectively in a Texas classroom. This test is made up of questions that measure these competencies."

Source: State Board of Educator certification. 1998. ExCET Preparation Manual. National Evaluation Systems, Inc., Amherst, MA

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Appendix B

ExCET Sample Items

Decision Set Begins Here

Sixth-grade teacher Kathleen Larson has begun a unit on plans with her class. Jessica Cortez, a student in the class, comments that her older sister, who is a student at the local college, recently took her to the college's botanical garden. Jessica's description of its huge greenhouse filled with tropical plants prompts several students to ask Ms. Larson whether the class could take a field trip to the site. Ms. Larson is enthusiastic about the idea and tells the class she will check into the possibility.

52. Which of the following would be the most appropriate *first step* for Ms. Larson to take as she considers whether to proceed with plans for the proposed field trip?

A. Send home students' parents and guardians an explanation of the proposed trip and ask for their feedback.
B. Conduct a student poll to determine if all the students are in favor of the proposed field trip.
C. Ask other teachers for their opinions about the likely value of the proposed field trip.
D. Contact college officials to inquire whether the facility offers educational visits for student groups and, if so, how the visits are conducted.

53. Taking students on a field trip associated with an instructional unit is likely to benefit students most by:

I. exposing them to more complex and challenging cognitive tasks than in the classroom.
II. enhancing the self-esteem of students who have negative perceptions of their own academic potential.
III. helping them develop an awareness that learning takes place both inside and outside the classroom.
IV. providing them with the opportunities to encounter actual examples of subject matter they are studying.

A. I and II only
B. I and IV only
C. II and III only
D. III and IV only

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Appendix C

Tables

Table 1. Descriptive Means of Variables used to Determine Success for Secondary Preservice Teachers Professional Development Teacher Certification Exam (ExCET).

Variables	Mean	SD	N=87
Overall Grade Point Average	2.82	.34	
Grade Point Average in 18 credit hours of professional education courses	3.42	.35	
ACT	17.38	3.79	
TASP (writing subtest)	248.33	21.24	
TASP (reading subtest)	258.84	20.13	
TASP (mathematics subtest)	253.82	19.96	
Practice or Pretest ExCET	37.76	2.34	
ExCET (professional development subtest)	68.60	9.62	

Table 2. Correlation Matrix of Variables used to Determine Success for Secondary Preservice Teachers Professional Development Teacher Certification Exam (ExCET).

	Overall GPA	GPA (edu.)	ACT	TASP (writing)	TASP (reading)	TASP (math)	Practice ExCET	ExCET (prof.dev.)
Overall GPA		.531 P=.001*	.475 P=.001*	.081 P=.454	.330 P=.002*	.108 P=.320	.241 P=.025*	.152 P=.161
GPA (education courses)			.270 P=.012*	.123 P=.258	.310 P=.003*	.102 P=.346	.158 P=.143	.299 P=.005*
ACT				.328 P=.002*	.572 P=.001*	.226 P=.036*	.390 P=.001*	.549 P=.001*
TASP (writing subtest)					.541 P=.001*	.300 P=.005*	.199 P=.064	.411 P=.001*
TASP (reading subtest)						.171 P=.114	.426 P=.001*	.612 P=.001*
TASP (math subtest)							.026 P=.811	.171 P=.113
Practice ExCET								.496 P=.001*
ExCET (prof. dev.)								

*Significant level p<.05

Table 3. Correlation Matrix of Variables used to Determine Success for Secondary Preservice Teachers Professional Development Teacher Certification Exam (ExCET), controlling for ACT.

	Overall GPA	GPA (education)	TASP (writing)	TASP (reading)	TASP (math)	Practice ExCET	ExCET (prof.dev.)
Overall GPA	.475 P=.001*	-.090 P=.410	.081 P=.461	.001 P=.995	.069 P=.530	-149 P=.172	
GPA (education courses)		.038 P=.732	.197 P=.069	.044 P=.686	.060 P=.584	.187 P=.084	
TASP (writing subtest)			.456 P=.001*	.246 P=.023*	.082 P=.454	.293 P=.006*	
TASP (reading subtest)				.053 P=.631	.269 P=.012*	.434 P=.001*	
TASP (math subtest)					-.069 P=.528	.058 P=.593	
Practice ExCET						.366 P=.001*	
ExCET (prof. dev.)							

* Significant level p<.05

Table 4. Summary of Regression Results for Determine Success for Secondary Preservice Teachers Professional Development Teacher Certification Exam (ExCET).

Independent Variables				
TASP (reading subtest)				
	Multiple R	.6117		
	R Squared	.3741		
	Adjusted R Square	.3668		
	Standard Error	7.6563		
Analysis of Variance				
		DF	Sum of Squares	Mean Square
	Regression	1	2978.27	2978.27
	Residual	85	4982.65	58.62
F= 50.81	Significant F= .0000			
Practice ExCET				
	Multiple R	.3345		
	R Squared	.4416		
	Adjusted R Square	.4283		
	Standard Error	7.2747		
Analysis of Variance				
		DF	Sum of Squares	Mean Square
	Regression	2	3515.53	1757.77
	Residual	84	4445.39	52.92
F= 33.21	Significant F= .0000			
ACT				
	Multiple R	.6928		
	R Squared	.4799		
	Adjusted R Square	.4611		
	Standard Error	7.0629		
Analysis of Variance				
		DF	Sum of Squares	Mean Square
	Regression	3	3820.45	1273.48
	Residual	83	4140.47	49.89
F= 21.1867	Significant F= .0000			

Appendix D

Kolmogorov - Smirnov Goodness of Fit Test

Residual

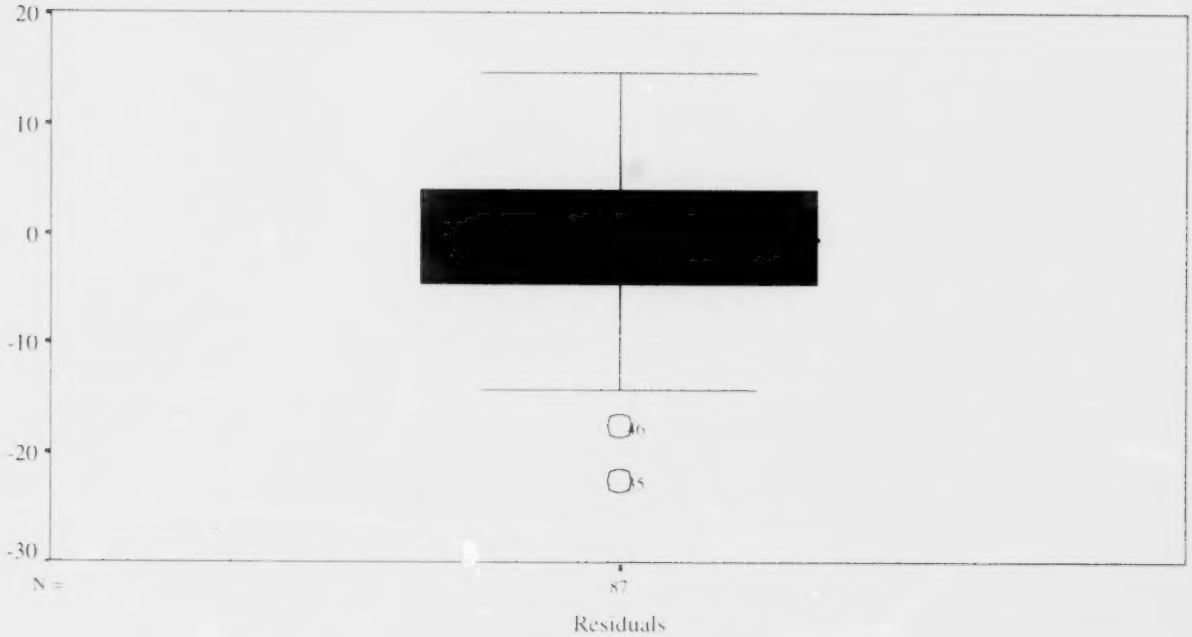
Most extreme difference	2-Tailed P
.05416	.9606

Stem and Leaf Plot

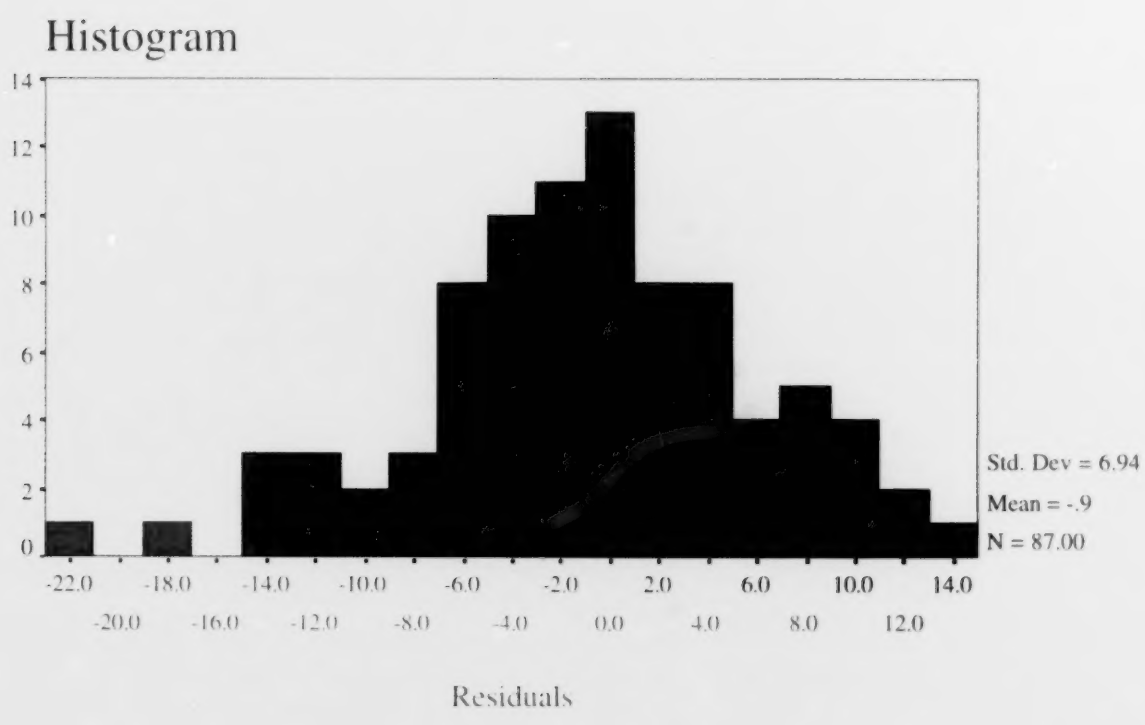
Residual

Frequency	Stem &	Leaf
2.00	Extremes	(-23), (-18)
6.00	-1 *	112334
13.00	-0 .	5666666677899
28.00	-0 *	0000000111111112223333334444
22.00	0 *	0000001112222233444444
12.00	0 .	556677888999
4.00	1 *	0114

Stem width: 10.00
Each leaf: 1 case(s)



Box and Whisker Plot


Histogram
14
12
10
8
6
4
2
0
-22.0
-20.0
-18.0
-16.0
-14.0
-12.0
-10.0
-8.0
-6.0
-4.0
-2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
Std. Dev = 6.94
Mean = -.9
N = 87.00
Residuals